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BY CAPTAIN R. H. ELLIOT, M.B., B.S. (LOND.), F.R.C.S. (ENG.), &C.,

Ind. Med. Service, Madras; lately Acting Superintendent of the Government Ophthalmic Hospital, and Professor of Ophthalmology, Medical College, Madras.

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DURING 1902 I was fortunate enough to be able to visit a number of the principal eye-hospitals in Italy, Switzerland, Austria, Germany, Belgium, Holland, Poland, Russia, Denmark, Sweden, and France. I had the additional advantage of official introductions to the various Governments, which had been most kindly obtained for me by His Excellency the Secretary of State for India, at the courteous instance of my own Government. If there was one thing more than another which my opportunities impressed on me, it was the variety of method employed by different surgeons to obtain the same end. Nowhere was this extraordinary diversity of procedure more obvious than in the conduct of a cataract-extraction, and I have accordingly chosen that operation as the text of the following pages, confining my remarks to Continental experience,[1] and leaving home practice out of my paper for obvious reasons.

Each stage of the operation will be dealt with in turn.

[1] The following are the names of the surgeons whose methods are alluded to in the present paper :—

Prof. Sbordone (Naples).
Prof. Businelli and Prof. Scellingo (Rome).
Prof. Otto Haab (Zurich).
Prof. Eversbusch, H.R.H. Duke Carl Theodor, and Dr. Zenker (Munich).
Profs. Fuchs and Schnabl (Vienna).
Prof. Pagenstecher (Wiesbaden).
Dr. Tacke and Prof. Coppez (Brussels).
Dr. Rogman (Ghent).
Prof. de Haas (Rotterdam).
Profs. Straub and Juda (Amsterdam).
Profs. Snellen, Senr. and Junr. (Utrecht).
Dr. Bouvin (The Hague).
Profs. Hirschberg, Greeff, and von Michel (Berlin).
Prof. Kanochi (Warsaw).
Prof. Krukoff, and Drs. Adelheim and Golowin (Moscow).
Prof. Schroeder (St. Petersburg).
Prof. Widmarck and Dr. Nordenson (Stockholm).
Prof. Csullstrand (Upsala).
Profs. Hansen-Grut and Bjerrum (Copenhagen).
Prof. Volckers (Kiel).

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PREPARATORY MEASURES.

The Sterilisation of Instruments.—In the clinics which I have visited this is effected by (1) moist heat, (2) dry heat, or (3) the action of antiseptic solutions.

The favourite form of *moist heat* is boiling water to which some sodium carbonate has been added. A few use distilled water, either plain or after the addition of the sodium-salt. All the Continental surgeons I met admitted that the knife suffered from boiling. To minimise this Hirschberg, Nordenson, and others avoid placing it in the tray with the other instruments, and instead hold it for a short time in the boiling fluid. Others except the knife from boiling, and prepare it in other ways. Juda, for instance, soaks it for 20 minutes in a sterilised soap-solution, and then carefully washes it with sterilised wool and water. Very few seem to use steam to sterilise their instruments. I prefer its use to that of any other agent.

Dry heat has not a few advocates. Adelheim and Krukoff use it at 105° C., Nordenson at 150°, and de Wecker at 160°.

Very few trust to antiseptic solutions alone, but De Haas relies on absolute alcohol, and Schroeder on the biniodide. It is, however, a common thing to see a surgeon who uses one or other form of heat-sterilisation transfer his instruments into an antiseptic solution till such time as he is ready to use them. A variety of antiseptics are used for the purpose, amongst which I may mention several salts of mercury, for instance, the perchloride, the cyanide, and the biniodide.

A few operators have each instrument passed through boiling water (*e.g.*, Krukoff) or through a flame (*e.g.*, Lapersonne) before using it a second time, whilst Landolt takes care to have duplicates ready, so that it is never necessary to use any single instrument twice.

Personal Asepsis of the Surgeon.—Very many of the operators I met carefully washed their hands before each operation, and then soaked them in an antiseptic lotion. Some dried them on aseptic towels, others allowed them to dry in the air, while Landolt puts on loose, sterilised, linen gloves from the moment he finishes washing till he commences operating, when he throws them aside. His assistants do the same. Some operators go so far as to use specially-sterilised

soap in tubes. Hirschberg puts on a sterilised over-all apron, and asks all who approach the operating table to do the same. Very few ophthalmologists cover the patient's face with sterilised cloths to protect their hands during operation. Greeff and Lapersonne both take this precaution. Landolt and Völckers confine female hair within rubber bathing-caps on the operating table. De Wecker ridicules all such measures as "l'antisepsie d'ostentation." As might be imagined, one saw many lapses from the grace of a perfect antisepsis in different clinics, but it would be ungracious to linger over them.

Choice of Assistants.—Some operators multiply the number of their assistants, giving to each one a small task, whilst others are careful to limit the numbers of hands which approach their patient. De Haas, Sbordone, and Rogman prefer to operate without any help from assistants, while the majority of surgeons accept the aid of one or, at the outside, of two helpers. As a general, but unfortunately not as an invariable, rule, the operator demands the same standard of asepsis from his subordinates as he practises himself. A few, like Hirschberg, will allow no one but themselves to touch their instruments, while some detail a special instrument-assistant to feed them as they require.

Some surgeons make a point of operating as soon as they reach their clinics with the double aim of avoiding carrying infection and of giving their best and freshest moments to the responsible work of the theatre. Others prefer to finish the wards and out-patients first, in order to know what is before them for the day.

Choice of Instruments.—Trousseau uses only one instrument for an extraction, viz., a knife. Masselon adds another, to wit, a pair of conjunctival forceps. Fuchs, whilst not otherwise limiting himself, omits the use of a speculum. Landolt, at the opposite pole of practice, not only keeps ready every instrument he may by any chance want, but also makes a point of having by him duplicates of any part of his armentarium which may be required more than once.

Preparation of Drops used.—Many surgeons dissolve their alkaloids in antiseptic solutions of different natures and strengths. De Haas uses $\frac{1}{1000}$ perchloride, Adelheim $\frac{1}{6000}$ cyanide, and so on. Trousseau and others prefer distilled

water for a vehicle. Many sterilise their drops by heat. Hirschberg boils all his in special bottles made of a glass which, according to his claim, does not admit of chemical changes occurring between it and the alkaloids. He has a separate bottle of drops of each kind for each different patient.

Cocaine still appears to hold its own as the local anæsthetic for extractions, and it was quite the exception to find other alkaloids in use in any of the clinics I visited. Rogman favours tropacocaine, while Hirschberg recommends a mixture of cocaine and holococaine. These are the only exceptions to the use of cocaine I can recall.

PREPARATION OF THE PATIENT.

General Considerations.—Landolt keeps his patient in bed, or at least in hospital, for several days before an extraction, with a view to studying his state of health, preparing him for operation, and getting him used to his new surroundings. On the other hand, I have seen De Wecker take a cataract-patient on to the operation-table direct from the O. P. room. With a wide divergence in detail, most ophthalmologists conform, in their practice, rather to the more cautious habits of the first-named surgeon.

Cleansing of surrounding Skin.—De Wecker is averse to the use of soap, on the ground that it is irritating to the conjunctiva. Fuchs so far agrees with him as to avoid soap on the day of operation. Most surgeons, however, use it freely, either on the day of operation, on the preceding day, or on both. Immediately before an extraction most ophthalmologists wash the surrounding skin freely with one form or another of antiseptic lotion. Landolt prefers to use sterilised soap and water for the purpose, in order to avoid any irritation of the delicate skin of the parts.

Völckers keeps the eye covered for an hour before an extraction with a pad soaked in $\frac{1}{1000}$ solution of perchloride. Lapersonne speaks highly of Panas' method of closing the eye for 24 hours before operation with a dressing soaked in a $\frac{1}{250}$ solution of biniodide of mercury in sterilised oil. A few others leave an antiseptic pad placed over the eye from the time it has

been got ready till they are about to operate, but otherwise I have met with no imitators of the more systematic efforts to sterilise the skin by dressings, which I have just described.

Treatment of the Lashes.—Most surgeons leave the cilia uncut, and thereby run no small risk of fouling their instruments thereon during operations, as I have had more than one opportunity of observing. A few operators, amongst whom one may mention Von Michell, of Berlin, cut the upper lashes only; others cut those of both lids, whilst I limit myself to dealing with those on the temporal half of the upper lid, thus protecting my knife from soiling at the expense of a minimum of mutilation. Schiotz and Nordenson epilate both lids entirely. Hansen Grut tried this plan, but gave it up on account of its painfulness.

Panas laid great stress on cleansing the lid-margins with pledgets of wool soaked in an antiseptic. Each lid is seized and held in turn for the purpose. Schroeder substitutes benzene for an antiseptic in carrying out this measure.

Cleansing of the Conjunctiva.—De Wecker is in a marked minority in considering that the conjunctival sac, provided its lining membrane is healthy, should not be interfered with before an extraction, for the great majority of ophthalmologists are of the opposite opinion. Some irrigate the cavity with an aseptic solution, which acts purely mechanically as a sweeper, or which at the most exerts a solvent action on flakes of mucus. Thus we find that Kanochi, Krukoff, and Völckers employ normal saline solution for the purpose, whilst Landolt uses a sterilised solution of boric acid, and Schnabl a one-per-cent. lotion of bicarbonate of soda. Others, however, prefer antiseptic irrigations of various natures and strengths. Von Michell uses perchloride lotion at $\frac{1}{3000}$; Fuchs employs the same solution at $\frac{1}{4000}$; Sbordone, Karl Theodore, Haab, Pagensticher, Hirschberg, and Greeff select a strength of $\frac{1}{5000}$, whilst Hansen Grut and Bjerrum prefer $\frac{1}{6000}$. Adelheim, Trousseau, and Rogman irrigate the sac with various strengths of the bicyanide solution. Lapersonne favours the biniodide. Nordensen and others the oxycyanide, and so on. My own preference is for a $\frac{1}{3000}$ solution of freshly-prepared Chinosol, but at the same time I rely rather on the mechanical than on the antiseptic action of the fluid. In this respect I

believe I am at one with the great body of European ophthalmologists.

Treatment of the Lachrymal Passages.—There is considerably more difference of opinion here than we met with under the last heading. If suppuration be present, all are agreed as to the necessity for preliminary measures, but it is otherwise when we come to consider the bearing of old chronic obstructions, where the sac contains a clear fluid, or where obvious signs of disease are conspicuous by their absence. De Wecker implies his scepticism as to the need of excluding such cases from the theatre, and many reliable surgeons, amongst whom I may mention Hansen Grut and Bjerrum, consider that, unless there is definite evidence of disease, it is better to let the tear-conduits alone. Völckers, on the contrary, considers that "diagnostic irrigations" of these passages should be a routine part of the examination of a patient before he is submitted to an extraction. Kanochi and Nordenson go even further, and always syringe out the lachrymal passages before a major eye-operation, in order to remove any septic matter they may contain. A few surgeons are careful, with the same end in view, to empty the sac by firm digital pressure.

Völckers and many others, if in doubt as to the state of the passages, extirpate the sac before performing an extraction. Fuchs either extirpates, or else splits the anterior wall, and plugs the cavity. Haab prefers temporarily to obliterate the puncta, whilst my own preference, in mild cases, would be to close the canaliculi for the time being by means of small sutures.

THE OPERATION.

Position of Operator, &c.—Most Continental operators whom I saw at work stand behind for the right eye and to the left front for the left eye. I noticed one surgeon who stood at the right front for left eyes. Several ambidextrous German ophthalmologists work on both eyes from in front, thus reversing the procedure followed by English operators in India, who usually stand behind for both eyes.

In the majority of clinics extraction is performed on a table, but some surgeons prefer a low couch, and others a

sloping chair. A few perform secondary discissions with the patient sitting opposite to them, upright, in a straight-backed chair.

Most surgeons prefer to operate by daylight, but there are some, both in Great Britain and the Continent, who elect, as do De Wecker and Masselon, to operate by artificial light. Snellen's blackened operating room, with its wide window-space covered by black blinds, any one of which can be drawn up separately, is probably known, by repute at least, to all. It is the rule to see the patient laid parallel to the window, with the eye under operation on the same side as the source of light, but there are those who prefer to place the patient with his feet towards the source of light, whilst they stand behind his head.

Those who use artificial light commonly employ a bull's-eye electric lamp, which is entrusted to a special assistant. In the new clinic at Hamburg, I saw a very beautiful little electric forehead-lamp worn by the surgeon. Its many advantages are too obvious to need mention.

Management of the Patient.—Some ophthalmologists take a great deal of trouble with their patients in the few days before an extraction ; they train them to open their eyes widely, to close them gently, to look down, and so on. Hansen Grut is especially careful about this training. During the operation he asks the patient to hold up his hand and keep watching it. Many surgeons adopt the same manœuvre ; others again simply bid the patient look towards his feet, whilst an assistant aids the effort by gently pinching his toe ; yet others ask a bystander to raise his hand to assist the patient in fixation, or to hold up a light or other bright object for the same purpose. My own plan is to operate with the patient's feet towards a window, and to bid him look steadily at the light. Adelheim and de Haas make a great point of putting cocaine in both eyes, instead of in the operated eye only. I have seen this done in London also, and all who do it say that it helps to keep the patient quiet. Krukoff and Kanochi, with a similar object in view, close the opposite eye during an extraction.

If a patient becomes restless and frightened, some operators try to reassure him by talking quietly to him ; failing this, many slap him sharply, and the effect is often magical in

bringing a nervous subject back to self-respect. Tacke gives a timid patient chloroform. My own practice, which I cannot too strongly recommend, is, if I find a patient getting out of hand, to delay the operation for 15 minutes, and give a hypodermic of morphine. The result is magical, but it is *essential that the preparation used should be fresh and active, and that the injection should be rubbed in,* so as to secure an early and powerful action. Of course the state of the kidneys must have been ascertained beforehand.

The Incision.—The great majority of European operators make an upward incision, which they keep in the limbus throughout its whole extent. A few, like Fuchs and Pagenstecher, prefer to add a small conjunctival flap. Professor Snellen (junior), of Utrecht, has adopted a sideral incision wholly outside the limbus, and he denies that this procedure increases the risks of vitreous or iris-prolapse. Adelheim, of Moscow, is the only other surgeon I have met who adopts this method of opening the eye. Völckers, of Kiel, who makes a limbus-incision for simple extractions, modifies his method for the combined procedure, and while making his puncture and counter-puncture in the sclerotic brings out his blade at the summit of the clear cornea, thus irresistibly reminding one of Von Graefe's "modified linear extraction." Italy was the only country in which I saw "purely corneal incisions" in use. Professor Sbordone, of Naples, and Professor Scellingo, of Rome, were, indeed, the only two operators in Europe whom I noticed adopting this rare method of commencing an extraction. I could not help observing that, in Sbordone's cases at least, the low placing of the incision led to increased difficulty in delivery of the lens.

Another curious feature of Scellingo's technique is that he invariably makes a downward section, believing that it is much easier to deliver through a downward than through an upward cut. Schroeder, of St. Petersburg, and Nordenson, of Stockholm, prefer a downward section in the deeply-sunken eyes of Mongolian patients, in whom they find it difficult to make an upward section. In all ordinary cases, however, they follow the usual rule of working in the superior quadrant of the eye.

Rogman, of Ghent, has two peculiarities in the first stage of his operation, viz. :—(1) That he seizes the conjunctiva, with

his fixation-forceps, just below his expected point of counter-puncture, instead of in the usual position, and (2) that he appears to cut out with a straight pull instead of sawing out as others do. He is one of the most skilful operators I have ever watched at work.

Method of lacerating the Capsule.—For this purpose the cystitome remains the favourite instrument. Indeed, I saw it in use in nearly every country of Europe. The use of capsule-forceps, though warmly championed by Fuchs and by De Wecker, does not seem to have recommended itself to the profession. Sbordone, of Naples, and the Duke Carl Theodore and his assistant, Dr. Zenker, were the only other ophthalmologists, beside the two just mentioned, whom I saw using this instrument. De Wecker admits that it is a difficult instrument to work with and that it easily gets out of order. Trousseau, of Paris, lacerates the capsule with his knife-point during incision. This procedure has advocates in England, and I have used it myself in dealing with tough Morgagnian capsules, but it is not likely to be generally adopted, since it tends to sacrifice precision without offering any substantial gain in return. Nowhere out of India have I seen the capsule lacerated with a Bowman's needle before the incision is undertaken, and yet for precision and safety in effecting the needling, for the easy sterilisation of the instrument used, and for the valuable information thus acquired as to the consistency of the cataract, and the size of its nucleus (enabling us to graduate our size of incision accordingly), this method has to my mind no equal.

Before leaving the subject, one must mention Landolt's method, which, if rather quaint, has at least the virtue of thoroughness, a virtue which pervades all this surgeon's work. He uses two sickle-shaped cystitomes, one of whose curves looks to the right, whilst the other looks to the left. These instruments are introduced in turn, and swept across the capsule, which is thus freely lacerated in opposite directions by their curved cutting blades.

THE QUESTION OF IRIDECTOMY IN CATARACT-EXTRACTION.

This question has been so long discussed that some apology may be needed for bringing it up again. I trust that the

wide divergence of opinion which still exists on the subject may be taken as some justification of my action in doing so, especially as my object is rather to compare and contrast the opinions of others than to press forward any views of my own.

The cataract-operators whom I have met may be divided, for convenience' sake, into three classes, viz.:—(1) Those who always select the combined operation, if possible; (2) those who prefer to operate by the simple method, if they can; and (3) those who, possibly with a leaning for one or the other of the above methods, make a point of selecting the procedure to be adopted in each case, according to certain rules of their own.

It might be thought that in this, as in other cognate matters, nationality would exercise a considerable influence over surgical opinion, and indeed so far as Italy and Russia are concerned this seems to be actually the case. In Rome and Naples at least the bias is strongly turned towards the simple operation, whilst in Warsaw, Moscow, and Petersburg, I only met one single surgeon who shared the Italian views; all the rest looked on the performance of an iridectomy as almost a routine part of an extraction-operation which should never be omitted if it could be helped. In no other country of Europe, so far as I am aware, can a similar uniformity of practice in this respect be found. In Belgium one finds Tacke and Coppez, of Brussels, both strongly in favour of the combined operation, whilst not 40 miles away, at Ghent, is Rogman, who rarely departs from the simple method of extraction.

In Holland the undoubted bias of opinion is towards the combined procedure. De Haas, of Rotterdam, and Bouvin, of The Hague, never omit an iridectomy; Straub, after carrying out careful comparative series of operations, has come to nearly the same line of practice, as has also Juda, of Amsterdam. And yet, within a few miles of any of them at Utrecht, the Snellens only resort to the removal of a portion of iris under exceptional circumstances. In Germany, again, one meets with all shades of opinion, and the same may be said of Sweden, but in the latter country the leaning towards the combined operation is more marked, and the simple method has no ardent exponent that I know of. In Paris one finds Landolt and Lapersonne strongly impressed with the need of considering iridectomy a routine step in cataract-extraction,

whilst working side by side with them in the same city are two of the most ardent advocates of the simple method that I met with anywhere in Europe. I, of course, refer to De Wecker and Trousseau. Strangest of all was it to find in the one, and I believe the only, recognised eye-hospital of Denmark two surgeons working under the same roof, one of whom always performs the combined operation, whilst the other equally invariably aims at completing his extraction without an iridectomy ; and yet this is true of Hansen Grut and Bjerrum.

The list of surgeons who, even in my own small personal experience, look on iridectomy as an essential and not-to-be-omitted step in cataract-extraction, makes impressive reading. It includes Schroeder, Adelheim, and Kanochi, each from a great centre of Russian thought ; Landolt and Lapersonne, of Paris, Schnabl, of Vienna, De Haas, of Rotterdam, with a record of 2,100 extractions in 40 years of work, H.R.H. Carl Theodore, of Munich, whose total of extractions has passed 3,000, and others besides. Nor is this all the support accorded to "invariable iridectomy." Very significant was Fuchs' statement to me that he "always employs the combined operation for his private patients," for though he has strong leanings towards this method in his hospital practice he does not invariably use it there. I may add that his co-professor, Schnabl, has only settled down to routine iridectomy after fully trying the simple operation. Pagensticher, whilst himself selecting the procedure which seems best for each individual case, strongly advises all beginners invariably to include iridectomy in their operation for extraction. Lastly, there are not a few surgeons, both on the Continent and at home, who in cases in which there is only one eye, or in which other indications for special care exist, not merely include an iridectomy in their operative measures, but perform that step as a preliminary sitting. Strangest of all is it that this precautionary measure should be adopted by two of the most ardent advocates of the simple operation to be found in Europe, and yet this is true of De Wecker and Snellen (junior). Lapersonne, who, as has already been said, looks on the removal of a portion of iris as a routine step in his extractions, does iridectomy as a preliminary operation in all cases of immature or complicated cataract, and in those whose general health is bad.

It will be of interest to turn now to the opinions of some of the advocates of the simple operation. Hirschberg prefers to operate by this method, if possible, but prides himself on individualising most carefully in each case. Trousseau's only indication for iridectomy, in extraction, is the presence of a cough. De Wecker names two indications, viz. :—(1) Difficulty in immobilising his patient, and (2) immaturity of the cataract. Rogman likewise names two, which are (1) a tendency to iris-prolapse after completion of the operation, and (2) an injury to the iris during the performance of the section. Bjerrum shares Rogman's first indication, which indeed is his only guide for iridectomy, provided he can keep his patient quiet after operation. Snellen (junior), who uses pilocarpine drops after operation, never performs the combined operation at one sitting if he can avoid so doing. For the extraction of immature, hypermature, and complicated cataracts he considers that an iridectomy is called for, but he performs it at a preliminary séance. In no case would he venture to operate without iridectomy on a patient whom he could not immobilise after operation. One Russian surgeon and the Italians conclude my list of Continental advocates of the simple method. I may mention that the use of myotics, either after or before extraction, is by no means universal in the practice of those who omit an iridectomy.

Apart from the usual arguments, viz., æsthetic considerations, the retention of a measure of accommodation, and the perfection of the light-regulating diaphragm advanced in favour of simple extraction, there are four contentions which I have often heard put forward by the Continental advocates of the method. These are (1) that prolapse is a comparatively uncommon complication ; (2) that it also occurs after extraction by the combined operation ; (3) that it is not really a very serious matter ; and (4) that the operative measures for its relief are not very dangerous in their nature. Leaving the more time-honoured considerations aside, as they have been so fully discussed elsewhere, I wish to say a few words on the above four headings.

(1) A table showing the admitted percentages of prolapse of the iris occurring in the practice of a number of different advocates of the simple operation could not fail to be of great

interest, and an effort to compare and harmonise the results obtained would be likely to lead to valuable conclusions. I endeavoured to collect the requisite information at the various clinics I visited, but was obliged to give up all hope of doing any good, for I found that, while the figures quoted to me differed widely, there were but very few instances in which they had been derived from a painstaking survey of accurately kept statistics. There is one point, however, on which an overwhelming majority of Continental ophthalmologists appear to have clearly come to a decision, viz., that it is not possible to exclude prolapse of the iris even after the most careful selection of cases or by means of any known technique.

(2) Probably everyone will admit that in a certain number of cases the cut edges of the iris become involved in the section during healing, and even that, in a further small percentage, an actual prolapse of the same portions takes place. The frequency of these accidents can be greatly reduced by paying strict attention to the thorough replacement of the iris after delivery of the lens. It has been my experience that, even when prolapse does occur under these circumstances, the accident is of a much less serious nature than when occurring after simple extraction. In this opinion I have been fortified by the experience of a large number of Continental surgeons, amongst whom were some of the advocates of *extraction sans iridectomie*.

(3) and (4) We may take the dangers of prolapse of the iris and the gravity of the measures for its relief together. I look upon prolapse of the iris as a most serious complication of the after-course of an extraction, and have been astounded to hear surgeons of experience express a different opinion. Again in all marked cases of prolapse I have been led to look on the opening of the section and the free removal of the caught iris as absolutely necessary for the safety of the eye, but, at the same time, as measures involving no small hazards. Even when the prolapse is of small extent and gives rise to no urgent symptoms I am far from regarding its occurrence without misgivings as to the future. It then becomes a matter of balancing the risks of action and inaction ; even when action is decided upon it may be limited to a cauterisation of any protruding portion of the iris. Here again have my cherished

beliefs been rudely assailed, and I have been told that it is very seldom necessary to interfere with a prolapse, and that even when such interference is necessary it may be undertaken with a light heart. Such are not, however, the views commonly held on the Continent; and from a large number of ophthalmologists, from east to west and from north to south of Europe, I received it, in no uncertain terms, that prolapse is to their minds a very dangerous complication, and that the operation of opening the section, removing the portion of impacted iris and freeing the membrane is, in their experience, often necessary, and is farther a very serious addition to the risks of the first operation. And yet, with all its added dangers, it is not difficult to see that surgeons everywhere still hanker after simple extraction. I have already given the indications accepted by some as a calling for a departure from their usual practice of never resorting to iridectomy, if they can help, and now turn to review the conditions which sometimes induce advocates of the combined operation to depart from their beaten track. Eversbusch, of Munich, performs a simple extraction only if the patient is in good health in all respects, and if the chamber is deep, the iris active, the tension normal, and the tunics and vitreous healthy. Völckers occasionally ventures on the same method when all the above conditions are fulfilled, but even then he finds himself unable positively to exclude prolapse, and hence has a strong leaning towards invariable iridectomy. Juda, while following generally the same lines as Eversbusch, adds an extra condition, viz., the youth of the subject. Hirschberg and Pagensticher insist most strongly on the necessity of minutely and carefully examining each case, in order that each may be decided on its own merits. Speaking generally, their indications for selecting the simple method seemed to agree with those of Eversbusch, and in the same category I may also include Greeff and Coppez. I omitted to mention that Eversbusch considers cases of soft cataract as particularly suitable for the exhibition of the operation without iridectomy.

Widmarck performs the simple operation in mature, and the combined in immature, cases. He keeps the former five days in bed after operation and the latter only two days. He has twice met with sudden death from syncope in old patients on their first rising from the horizontal position in which they had been

kept some days after an extraction. He, therefore, now always prefers the combined operation for old people. Nordenson, with characteristic caution, only resorts to a simple extraction when, in a binocular case of cataract, he has already obtained a good result by means of the combined operation on the other eye, and only then if all the indications are favourable. Fuchs considers that the results of a simple extraction are the most perfect obtainable, but that at the same time the risks run are distinctly greater than when a portion of iris is excised. Where all the indications are distinctly favourable, he would omit an iridectomy, with the proviso that this plan should be altered if the course of the operation should reveal an undue rigidity of the iris, a tendency of that membrane to prolapse after the operation is completed, or any other unforeseen abnormality. He especially prefers the omission of an iridectomy in the young on account of the better cosmetic results.

Time will not permit me to dilate on a number of other points, which, though of minor importance, are nevertheless of considerable interest, inasmuch as they illustrate the extraordinary number of ways that different surgeons take to do the same thing. Some operators perform iridectomy with straight scissors, others with curved, others again with cross-action scissors, and so on. Some make a point of always removing a large piece of iris; not a few hold that the smaller the iridectomy the better, and many do not seem to think that the matter is of any importance, if the looker-on may judge by their practice. Yet another detail. Most operators cut the iris off with one bold closure of the scissors, whilst a few are careful to carry their section right up to the iris-attachment by means of two or more snips. The greater number of surgeons will probably agree with me that if an iridectomy is to be done at all, it is both easier and safer to do it before the escape of the lens. Bjerrum, however, holds the opposite view.

REMOVAL OF THE LENS.

The methods in vogue for this purpose are very numerous, and will be better understood if we divide the subject up into two heads, viz. :—(1) the delivery of the nucleus, and (2) the removal of the cortex.

(1) The nucleus may be delivered (*a*) by instruments alone, (*b*) by digital manipulation alone, or (*c*) by a combination of the two.

(*a*) Sbordone delivers by the aid of two knife-handles; Schroeder, De Haas, and Rogman by two spoons; Lapersonne with a curette and spatula; others use their fixation-forceps and a curette attached to the opposite end of the knife-handle; this last method saves multiplying instruments, but is an objectionable practice. The retention of the speculum is almost a necessary condition for purely instrumental delivery. A few operators follow Hansen Grut in using only one instrument, which is applied below, the lids being separated and the patient told to look down steadily.

(*b*) Fuchs delivers by digital pressure, exerted through the lower lid on the inferior portion of the cornea; the upper lid is held out of the way. Landolt and Masselon use bi-manual digital pressure, by working with a thumb or finger through each lid; they thus obtain pressure and counter-pressure. Landolt, of course, removes the speculum before employing this manœuvre, while the other two do not use one at all.

(*c*) Yet other surgeons combine the two previous methods; they remove the speculum, if they have employed one, and getting an assistant to depress the lower lid, they use an instrument below, while a finger above supplies the counter-pressure. De Wecker is one of those who use this manœuvre.

(2) Not a few methods are adopted to rid the chamber of cortex. Many employ massage applied through the lower lid, the upper one being raised out of the way. Among such are Kanochi, Krukoff, Sbordone, Hansen Grut, Fuchs, and Lapersonne. Others prefer bi-manual digital massage for the purpose, a finger or thumb working through each lid. Trousseau, Landolt, and Masselon, who, as we have already seen, employ this latter method to express the nucleus, continue thereafter to use it to rid the chamber of débris. De Wecker also uses it in this stage of the operation.

Of those who deliver the nucleus by the aid of instruments, a large percentage continue to use those same instruments for the evacuation of any cortex which has been left behind; this manœuvre, which we may speak of as "instrumental massage," consists in stroking the cornea in the direction of the incision

with a curette, scoop, spoon, or other instrument. I saw Schroeder, Rogman, and De Haas using this means, which Csullstrand and Von Michell also employ. A few surgeons introduce a curette, scoop, or spoon into the chamber to remove therefrom cortical masses which less direct methods have failed to displace. Fuchs, Kanochi, Schroeder, De Wecker, and others resort to this method, though most of them will probably agree with the last-named in considering it a dangerous procedure. Most, but not all, of the operators, who enter the anterior chamber in this hazardous way, are very careful to sterilise afresh the instrument introduced before each new entry of the chamber.

De Wecker holds strongly that all lens-débris should be evacuated, on the ground that masses left behind swell up, and favour prolapse. For the same reason Lapersonne is most patient and painstaking in his efforts to clear the anterior chamber of all lens matter, and to this end he allows the aqueous to reform repeatedly, and performs massage again and again. Gullstrand, Rogman, De Haas, and others avoid pushing the cleansing of the chamber too far, fearing the grave dangers which over-interference is liable to entail; not least among such is loss of vitreous.

I have kept till last a mention of M'Keown's method of intra-ocular irrigation, which appears to me to have never been sufficiently tried by ophthalmologists. It has given me far the best results of any method I have tried, and I have had ample opportunities of using all those commonly advocated. It is safe, clean, and effective, provided that the most ordinary care is taken, and after using the method on over 800 cataracts in eight months, it appears to me to be the one important step in advance made recently in the treatment of cataract. I am glad to be able to say that Fuchs, Haab, Nordenson, and Hansen Grut are now giving irrigation a fresh trial with instruments I had the pleasure of obtaining from Belfast for them. This paper is no place for farther details of the subject, which I have already dealt with fully elsewhere. (*Archives d'Ophthalmologie*, 1903, and *Ind. Med. Gazette, April* 1903.)

The Speculum.—The models of this instrument which one saw in use are too numerous to be even mentioned. Some insert it with its arms over the nose, others keep them on the

temporal side. Some entrust the blepharostat to an assistant, and lay great stress on the *rôle* the latter plays in avoiding undue pressure on the eye, whilst others leave the instrument quite alone and untouched. Some allow the speculum to remain in throughout the operation; others remove it as soon as the incision is made; yet others take it out after the iridectomy, or after the laceration of the capsule; lastly, as mentioned elsewhere, there are those who never use a speculum at all.

METHODS OF BANDAGING.

Hjort leaves both eyes unbandaged and uncovered. Masselon closes the operated eye alone, using for the purpose a narrow vertical strip of gauze soaked in collodion. De Wecker applies the lightest possible dressing to the operated globe, and keeps the pad in place by the aid of two narrow strips of collodioned gauze. Krukoff, Straub, Bouvin, and Hansen Grut all limit themselves to closing one eye only. The majority of operators still, however, close both. The period of closure varies within too wide limits to admit of an average giving any useful information. The operated eye is opened in from 24 hours to a week or 10 days, the opposite one being released at any time from 24 hours onward. A few operators open both together, while more keep the wounded one closed for a few days later than its fellow. Some keep the bandages on at night after they have been discontinued by day.

The forms of bandage which one sees employed for extraction cases are legion. They include rollers, figures-of-8, many-tails of numerous patterns, triangular bandages, modified night-caps, starched bandages, &c., &c. Then there are shields of many kinds which some use as substitutes for, or in addition to, bandages. These are single or double, are fastened on with tapes, with plaster, or with bandages; they are made of gauze-wire, of vulcanite, of celluloid, or of some form of metal; and, lastly, they differ widely in shape; some, like Wolff's pattern, have sloping upturned edges to save the patient's face, whilst others, like Snellen's metal model, are purposely provided with sharp margins, in order that these may cut into the subject if he attempts to interfere with his bandage; they are in fact intended to serve as timely reminders, lest he forget.

Some surgeons aim at providing firm pressure by means of their bandages, others only draw theirs sufficiently tight to keep the dressings in place, and so on. Some combine shields and bandages, or substitute the former for the latter, as soon as possible. A few, if in doubt as to the state of the lachrymal passages or conjunctiva, use a shield throughout to avoid retention of secretions, whilst others dispense with all covering of the eye under such circumstances.

In the matter of dressings, too, there is great variety, both as to their quantity and their nature. Between De Wecker's thin layers of gauze and the elaborate dressings of some other surgeons there are many intermediate stages, but in one respect most are agreed, for all who can do so sterilise them in an autoclave. A layer of lint or gauze is usually applied directly over the lids, and is succeeded by a pad of sterilised wool. Many surgeons soak their dressings in one form or another of antiseptic. Straub is peculiar in using a dressing of sterilised modified zinc-ointment, which, he claims, restrains secretion and keeps the eye dry. Landolt and Hirschberg not only keep each patient's dressings quite separate in the steriliser from those of any other, but are also careful to keep each constituent part of each dressing by itself.

Lastly, in closing, I may mention a variation from the standard type, which surprised me more perhaps than anything else I saw abroad. I refer to the practice of two well-known surgeons, Schnabl and Sbordone, of operating on both eyes for cataract at one sitting when possible. It is a practice which the Government of India forbids its officers to indulge in in the course of their Government work.